An Overview on High Health Care Costs in the US, Overdiagnosis, and Health Care Value

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Neither Dr. Tjahjadi nor Dr. Stallworth has any financial incentives or relationships to disclose.
The Healthcare System of the US

- We may have heard the phrases:  
  - Our healthcare system is **broken**  
  - Our spending in healthcare is **unsustainable**  

- The US spends **2.5 times** as much on health care as peer nations

- Yet some **US outcomes trail peer nations**  
  - Highest infant mortality rate  
  - Highest obesity rate

- US worst among high income countries when measured by specific population health outcomes

Ice-Breaker Question

Is it too conflictual to ask clinicians to be cost-conscious and at the same time keep the welfare of the patient foremost in their minds?

- Yes
- No
- It depends
Illustrative Case #1

15 year old AA male with SS trait presents with a 20 pound weight loss over 3 months despite an “ok” appetite. No change in bowel habits, no fever. He denies sexual activity and drug use, no history of blood transfusions and no other symptoms. He denies being depressed.

On PE, he is quite thin with decreased subcutaneous tissue. His VS are stable but a HR of 110. He has no thrush, lymphadenopathy or HSM. He is Tanner 3. His exam is otherwise non revealing.

From a health care value perspective, would you order an HIV?
Illustrative Case #2

+ In June, a 22 mo previously healthy child presents with a 2 day history of diarrhea, 1 day of which is now bloody. Tmax 101. No vomiting, taking PO well. Family history positive for cousin with Crohn’s Disease. Patient attends day care, no illnesses reported there. No foreign travel, pets, etc. Seems to have some cramping abdominal discomfort.

+ PE: In ED, T 100, P 110, other VS stable, Non-toxic, not dehydrated

+ Exam is not revealing except for abdomen that is mildly tender. No peritoneal signs, masses, or HSM. B. sounds, normal. Rectal inspection shows no fissures. Digital rectal exam not done.
Thoughtful Questions

- Spending more
  - Are outcomes different?

- Test and treatment
  - Can there be less health resulting from too much medicine?

- Technology creep
  - Just because a test or intervention has been developed and is available, is it indicated?
Goals and Objectives

1. Understand the concept of "less can be more" in health care value
2. Recognize the pitfalls of over-diagnosis
3. Appreciate the aspect of costs of common diagnostic modalities as they relate to health care value
4. Integrate health care value into practice
Theoretical Models

Affordability

Access  Quality
Theoretical Models of Increased Cost

- Consumer mentality
- Frivolous lawsuits
- Focus on “defensive medicine” to avoid lawsuit
- System inefficiencies
- Chronic illness & end of life care
- Prices for medical services
- Access to better technology
- Social barriers to health care
- Less focus on preventative health
- Pharmaceutical marketing
- Unrealistic expectations within medical care
- Higher rates of obesity
- Lack of knowledge on cost & healthcare value
- Tendency for overdiagnosis
- Cost of medical education
- More elective procedures
- Physician salary discrepancies
- Higher utilization of technology
Theoretical Models of Increased Cost

**Consumer mentality**
- Frivolous lawsuits
- Focus on “defensive medicine” to avoid lawsuit

**System & Policy**
- System inefficiencies
- Chronic illness & end of life care
- Prices for medical services
- Access to better technology
- Social barriers to health care

**Educational**
- Physician salary discrepancies
- Higher utilization of technology

**Cultural & Social**
- Less focus on preventative health
- Pharmaceutical marketing
- Unrealistic expectations within medical care
- Higher rates of obesity
- Lack of knowledge on cost & healthcare value
- Tendency for overdiagnosis
- Cost of medical education
- More elective procedures
Triangle of Conflicting Interests

**Consumer View**
What is best for me?

**Professional View**
What is best for medicine?

**Societal View**
What is best for society?

Yoshimura, JAMA, 2013
Reconciliation

**Consumer View**
- Autonomy
- Beneficence
- Nonmaleficence

**Professional View**
- Autonomy
- Beneficence
- Nonmaleficence
- Justice

**Societal View**
- Justice

Yoshimura, *JAMA*, 2013
Theoretical Models of Increased Cost

**Cultural & Social**
- Focus on “defensive medicine” to avoid lawsuit
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**System & Policy**
- System inefficiencies
- Consumer mentality
- Frivolous lawsuits
- Less focus on preventative health
- Higher utilization of technology
- Physician salary discrepancies

**Educational**
- Prices for medical services
- Access to better technology
- Social barriers to health care
- Higher utilization of technology
- More elective procedures
- Cost of medical education
Which of the following statements is/are true regarding reasons for higher health care costs in the United States in comparison to median values of peer countries in the OECD (Organization for Economic Cooperation and Development)?

A) The US has a higher percentage of elderly population (>65 years of age) per capita

B) The US has a higher percentage of smokers per capita

C) The US has a higher percentage of obesity per capita

D) The US has a higher percentage of physicians per capita

E) All of the above
Exhibit 1. Health Care Spending as a Percentage of GDP, 1980–2013

Notes: GDP refers to gross domestic product. Dutch and Swiss data are for current spending only, and exclude spending on capital formation of health care providers.  
Source: OECD Health Data 2015.
## Total Healthcare Spending in OECD Countries*

<table>
<thead>
<tr>
<th>Country</th>
<th>Per Capita</th>
<th>% GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$9451</td>
<td>16.9</td>
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<tr>
<td>Japan</td>
<td>$4510</td>
<td>11.2</td>
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<tr>
<td>OECD Average</td>
<td>$3184</td>
<td>9.0</td>
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<tr>
<td>OECD Median</td>
<td>$3984</td>
<td>9.1</td>
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</tbody>
</table>

*as of 2015

OECD.org, Health Statistics 2016
### Determinants of Health in OECD Countries*

<table>
<thead>
<tr>
<th></th>
<th>% Population Over Age 65</th>
<th>Tobacco Consumption (% age 15+ daily smokers)</th>
<th>Obesity (% pop BMI &gt;30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>14.5</td>
<td>12.9</td>
<td>38.2</td>
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<tr>
<td>Japan</td>
<td>25.6</td>
<td>19.6</td>
<td>3.9</td>
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<tr>
<td>OECD Average</td>
<td>15.3</td>
<td>19.3</td>
<td>22.8</td>
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<tr>
<td>OECD Median</td>
<td>15.4</td>
<td>19.6</td>
<td>23.3</td>
</tr>
</tbody>
</table>

*as of 2014

OECD.org, Health Statistics 2016
Pediatric Obesity

- In 2012:
  - More than 1/3 of children and adolescents were over-weight or obese

- In the last 30 years:
  - Obesity more than doubled in children and quadrupled in adolescents

- According to the Office of the Surgeon General, 2010:
  - Overweight adolescents have a 70% likelihood of becoming overweight adults

- Costs from childhood obesity in the US:
  - Is estimated at more than $14 billion annually, a figure that jumps to approximately $168 billion when obese children become obese adults

Ogden et al, JAMA, 2014
## Supply and Utilization of Doctors and Hospitals in OECD Countries*

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>OECD Average</th>
<th>OECD Median</th>
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</thead>
<tbody>
<tr>
<td>Practicing Physicians Per 1000 Population</td>
<td>2.6</td>
<td>3.3</td>
<td>3.3</td>
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<tr>
<td>Doctor Consultations Per Capita</td>
<td>4</td>
<td>6.8</td>
<td>6.5</td>
</tr>
<tr>
<td>Acute Care Hospital Beds Per 1000 Population</td>
<td>2.5</td>
<td>3.6</td>
<td>3.4</td>
</tr>
<tr>
<td>Avg. Length of Stay For Acute Care (Days)</td>
<td>4.8</td>
<td>7.5</td>
<td>6.9</td>
</tr>
<tr>
<td>Hospital Discharges Per 1000 Population</td>
<td>125.5</td>
<td>154.3</td>
<td>159.3</td>
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</table>

*as of 2014

OECD.org, Health Statistics 2016
## Diagnostic Imaging in OECD Countries*

<table>
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<th>US</th>
<th>OECD Average</th>
<th>OECD Median</th>
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<tbody>
<tr>
<td>MRI Exams Per 1000 Population</td>
<td>109.5</td>
<td>56.9</td>
<td>51.4</td>
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<tr>
<td>MRI Scan Fees**</td>
<td>1080</td>
<td></td>
<td></td>
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<tr>
<td>CT Exams Per 1000 Population</td>
<td>254.7</td>
<td>143.3</td>
<td>137.7</td>
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<tr>
<td>CT Scan Fees**</td>
<td>510</td>
<td></td>
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</tbody>
</table>

*as of 2014

**2011, US commercial average

OECD.org, Health Statistics 2016
Where the United States health system does MORE than other countries

<table>
<thead>
<tr>
<th>Service</th>
<th>United States</th>
<th>Rank compared with OECD countries</th>
<th>OECD average</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI units</td>
<td>31.6 per million population</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>12.5 per million population</td>
</tr>
<tr>
<td>MRI exams</td>
<td>97.7 per 1 000 population</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>46.3 per 1 000 population</td>
</tr>
<tr>
<td>CT scanners</td>
<td>40.7 per million population</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>22.6 per million population</td>
</tr>
<tr>
<td>CT exams</td>
<td>265.0 per 1 000 population</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>123.8 per 1 000 population</td>
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<tr>
<td>Tonsillectomy</td>
<td>254.4 per 100 000 population</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>130.1 per 100 000 population</td>
</tr>
<tr>
<td>Coronary bypass</td>
<td>79.0 per 100 000 population</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>47.3 per 100 000 population</td>
</tr>
<tr>
<td>Knee replacements</td>
<td>226.0 per 100 000 population</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>121.6 per 100 000 population</td>
</tr>
<tr>
<td>Caesarean sections</td>
<td>32.9 per 100 live births</td>
<td>6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>26.1 per 100 live births</td>
</tr>
</tbody>
</table>

Source: OECD Health Data 2012.
<table>
<thead>
<tr>
<th></th>
<th>Infant Mortality (per 1000 live births)</th>
<th>Life Expectancy (at birth)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>6.0</td>
<td>78.8</td>
</tr>
<tr>
<td>Japan</td>
<td>2.1</td>
<td>83.7</td>
</tr>
<tr>
<td>OECD Average</td>
<td>4.0</td>
<td>80.6</td>
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<tr>
<td>OECD Median</td>
<td>3.4</td>
<td>81.4</td>
</tr>
</tbody>
</table>

*2014

OECD.org, Health Statistics 2016
3.3. Life expectancy at birth and health spending per capita, 2013 (or latest year)

StatLink   http://dx.doi.org/10.1787/888933280727
Recent multi-institutional analysis

917,663 patients admitted to a PICU between 2004 and 2015 from 47 hospitals across the US were included in the study

Higher hospital costs were not linked to lower mortality for critically ill children

Let’s Summarize to This Point

- Health care spending in the US far exceeds that of other industrialized countries.
- The US has a below average supply and utilization of hospital beds and physicians, yet has increased utilization of elective procedures and expensive medical technology.
- The US has a smaller elderly population and fewer smokers, but has higher obesity rates.
- Prices are higher in the US for drugs, office visits, and procedures.
- Despite high health care spending in the US, quality indicators show variable performance.
Let’s Revisit Our Questions

- Spending more
  - Are outcomes different?

- Test and treatment
  - Can there be less health resulting from too much medicine?

- Technology creep
  - Just because a test or intervention has been developed and is available, is it indicated?
Theoretical Models

**Cultural & Social**
- Consumer mentality
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- Focus on “defensive medicine” to avoid lawsuit
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- Tendency for overdiagnosis

**System & Policy**
- Physician salary discrepancies
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- Higher rates of obesity
- Cost of medical education
- More elective procedures

**Educational**
- Less focus on preventative health
- Pharmaceutical marketing
- Higher rates of obesity

Focus on "defensive medicine" to avoid lawsuits.
Three Concepts

Overdiagnosis
Overtreatment
Overutilization
Definition of Overdiagnosis

- **Overdiagnosis**
  - Identification of an abnormality where detection will not benefit the patient
  - **Accurate** diagnosis
  - “True-positive”
  - “Commission”

- **Misdiagnosis**
  - **Inaccurate** diagnosis
  - “False-positive” or “false-negative”
  - “Omission”
Harms of Overdiagnosis

- Physical effects
- Psychological effects
- Financial strain
- Opportunity costs

*But overdiagnosis can be necessary to ensure larger gains for the children who do benefit from the diagnosis*

What are Causes of Overdiagnosis?

- **Defensive medicine**: peer review process is more critical of missing something rather than overtreatment

- **Social/cultural pressures**: belief that more tests and treatments done equates with better care (i.e. “do everything”)

- **Medical training**: emphasis is on diagnostic testing and rewards diagnosis of “zebras”

- **Publication bias**: publications slanted towards positive studies vs. negative studies

- **Minimize the feeling of uncertainty**: doing more feels safer (i.e. test “just to be safe” or to “rule out worst case scenario”)

Examples of Overdiagnosis

**Hypoxemia in Bronchiolitis**

No change in mortality despite increased number of hospitalizations since 1980, a period coinciding with increased use of pulse oximetry.

**Neuroblastoma Screening**

Identified more lower stage disease that would regress without treatment, but did not reduce end-stage neuroblastoma or mortality.

Impact of Overdiagnosis

+ **Overtreatment**: Medical services rendered which show no demonstrable benefit to the patient

+ **Overutilization**: Medical services provided with a higher volume or cost than is appropriate

---

Overdiagnosis

\[ \rightarrow \]

Overtreatment

\[ \rightarrow \]

Overutilization

\[ \rightarrow \]

Increased risk for patient harm
Examples of Overtreatment

- **Radiographic Pneumonia**
  - In hospitalized children, radiographic findings may not be bacterial pneumonia in 85% of cases

- **Bronchiolitis**
  - No reduction in hospital stay observed in patients treated with nebulized hypertonic saline

- **Hyperbilirubinemia**
  - Thresholds for treatment may be too low

Examples of Overutilization

+ CT scan for appendicitis
+ CRP in neonatal early onset sepsis
+ Frequency of head circumference measurements
+ Home apnea monitoring

Coon et al, Pediatrics, 2017
Examples of the Overdiagnosis Cascade

**Head Trauma**

- Normal Physical

  - Head CT
    - Abnormality Found
      - MRI with Sedation
        - Incidental Cyst

      - Neurosurgery Consultation

**Abdominal Pain**

- Consistent with Functional Pain

  - CMP

  - Normal but Alkaline Phosphatase is 2400

  - Ca, PO₄, AP isoenzymes
“Doing what’s best for the patient includes balancing the costs of diagnosis and treatment choices with their medical value.”

AAMC Reporter, June 2015

“We are not talking about compromised care. We are attempting to slant the value curve up, not the cost curve down.”

Hospital Pediatrics
Definition of Health Care Value

- What **health care value** is:
  - Maximizing quality of care while controlling cost

- What **health care value** is NOT:
  - Merely cheaper for the sake of being cheap
  - Assuming doing less is by default the safer and more cost-effective option
Operational Definitions of “Value”

- Health outcomes / dollars spent
- Quality of output / cost to achieve it
- Using process measures opposed to outcome measures
- Potential benefits from needed diagnoses / potential harms from over-diagnosis and the amount of resource utilization from over-diagnosis

Value = Quality / Cost

**Numerator: Quality**
- Safety
- Effectiveness
- Efficiency
- Timeliness
- Patient-centeredness
- Equity

**Denominator: Cost**
- Money
- Time
- Labor
- Intangibles
Measures of Quality

- **Underuse**: needed services not provided
- **Appropriate use**: provision of needed services
- **Overuse**: provision of unnecessary services
- **Misuse**: provision of potentially harmful services
# Measures of Quality

<table>
<thead>
<tr>
<th><strong>High Quality</strong></th>
<th><strong>High Costs</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Comforter</td>
<td>+ Cowboy*</td>
</tr>
<tr>
<td>+ Effectiveness</td>
<td>+ Meticulousness</td>
</tr>
<tr>
<td>+ High touch</td>
<td>+ High technology</td>
</tr>
<tr>
<td>+ Realization</td>
<td>+ Expectation</td>
</tr>
<tr>
<td>+ Saver</td>
<td>+ Spender</td>
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</tbody>
</table>

Health Care Value

Defensive Medicine
Cultural Pressures
Medical Training
Publication Bias
Uncertainty

Misdiagnosis
*Underuse*
*Or Misuse*

Increased Risk for Patient Morbidity

Overdiagnosis
*Overuse*

Increased Risk for Patient Morbidity

Patient Morbidity Minimized

Health Care Value
How Can This Balance Be Achieved

- **Communication**
  - Open communication between providers and patients

- **Conversation**
  - Continued conversation between health care workers

- **Culture**
  - Communication and conversations leading to change in culture
Ethical Tensions

- Conflict potential of physicians’ commitment to providing cost-effective care while maintaining the primacy of patient welfare

- Development of professional identity—a process by which one incorporates their own internal beliefs with various external influences to become a medical professional (affect heuristic)

Four Pillars of Medical Ethics

- Non maleficence
- Justice
- Beneficence
- Patient autonomy

If physicians perceive value-based recommendations as self-serving, they will question their ethical legitimacy and resist following them.

DeCamp, J Med Ethics, 2017
The Reality Check

Patient Satisfaction

vs.

Physician, PNP, PA Satisfaction

(depends perhaps on the definitions)
Steps Toward High Value Care

1. Understand the **benefits**, **harms**, and **relative costs** of the interventions that you are considering

2. **Decrease or eliminate the use of interventions** that provide no benefits and/or may be harmful

3. Choose interventions and care settings that **maximize benefits**, **minimize harms**, and **reduce costs** (using comparative-effectiveness and cost-effectiveness data)

4. **Customize a care plan** with the patient that incorporates their values and addresses their concerns

5. Identify **system level opportunities** to improve outcomes, minimize harms, and reduce healthcare wastes

Key-Solle et al, HCV Curriculum, Duke Children’s Hospital
Example when “Less is More”

- **Example 1**: Completing treatment of osteomyelitis with PO antibiotics at home
- **Example 2**: Not performing VCUG on all patients with UTI

Grady, *Arch In Med*, 2010
Effective Communication in the HCV World

+ Patient (and parents) understand the potential downside to more testing
+ Respond to patient concerns—what are they worried about?
+ Clarify management plans and lack of need for more testing
+ Formulate effective follow-up plan
+ Don’t concentrate on the costs of the tests (unless asked)—rather, communicate the quality of the patient’s care
+ May impact positively on the practice of defensive medicine
+ Proper documentation
Let’s Review

- Risk, benefits, and harms of over-diagnosis and testing
- Impact of social context
- Existing fears (doctor and patient)
- Public health concerns
- Need for urgency
- Consider costs, availability of tests, turn around time
US spends more on health care but has overall higher morbidity and mortality.

Recognition of overdiagnosis and its tendency toward overtreatment and overutilization are important for minimizing harm.

Pursuit of health care value is crucial for the provider.

Clear communication and transparency are vital.

Translate knowledge and awareness into practice.
Vignette 1

+ A 7 year old AA female presents as a new patient for her well child check.

+ She is coming to you because her previous provider refuses to see her because of failure to pay. Family has no insurance. No records are available.

+ Patient is healthy, but you note mild acne and a mild body odor. PE is normal except for the acne and some sparse curly black pubic hair and lipomastia. No clitoromegaly is present. Her BMI is at the 90th percentile.

What are the health care value issues in this case?
Vignette 2

- 5 month old thriving infant presents with spitting after every meal.
- She has been on several different formulas and now receives a thickened formula, but there has been little improvement.
- PE and growth parameters are normal.

What are the **health care value** issues in this case?
Science of Health Care Delivery

High Value Care

Thinking Value
Value Definition, Perspectives
Quality Gaps
Systems and Culture
Patient Safety
Measuring Quality

Creating Value
Applying the Scientific Literature in Patient Care
Evidence based medicine
Closing future knowledge gaps

Creating Value
Improving the System
Application of QI methods and tools
Disclosure of medical errors
Human systems integration (including diagnostic errors and other human factors, systems, engineering)
Analysis of systems errors

Creating Value
Balancing Quality & Cost
(High Value, Cost Conscious Care – HVCCC)
Ordering tests and treatments
Value discussions on rounds
Checkbook exercise
HVCC conversations with patients
Coding and documentation

*Slide adapted from Mayo Clinic School of Medicine
SHCD High Value Care Curriculum
1. “Choosing Wisely” pediatric lists. 3 pediatric lists—available at:
References (con’t)